C A U

Christian-Albrechts-Universität zu Kiel

Mathematisch-Naturwissenschaftliche Fakultät

IEAP
Extraterrestrische Physik

NMDB: an e-Infrastructure funded by the European Union's Framework Programme

CAPACITIES

C. T. Steigies[1] for the NMDB team
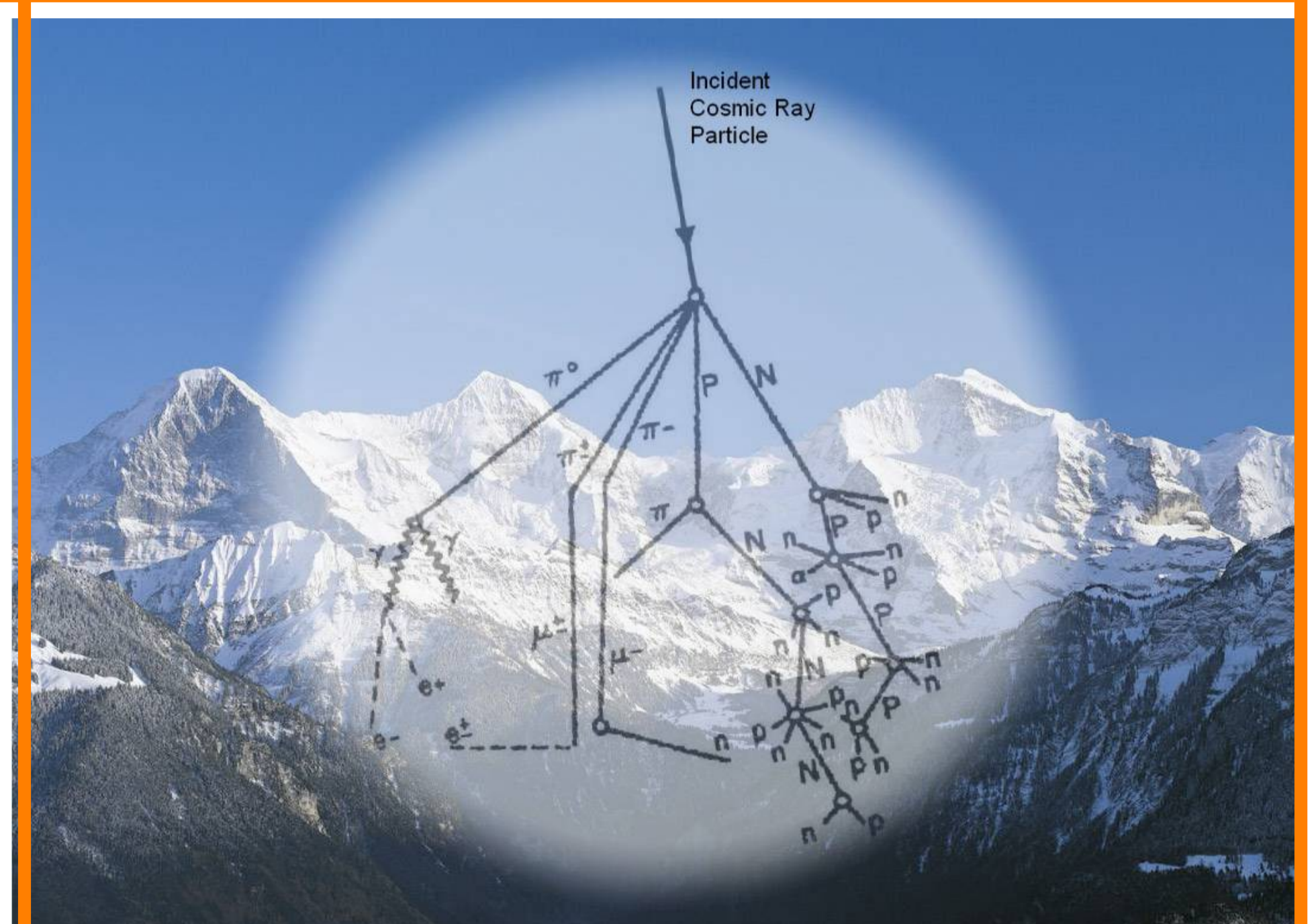[1]IEAP, CAU Kiel

e-infrastructure

Abstract:
The Real-time database for high-resolution neutron monitor measurements (NMDB) provides access to ground-based cosmic ray measurements from Neutron Monitors. As the project was funded only for two years, we have created a database that can be operated in the long term without incurring license fees. For this only an open source database comes into consideration. We chose MySQL as our database, since at the time of the creation of NMDB, MySQL provided the easiest solution to replicate the data to different servers, by which we can improve the accessibility of the data due to full NMDB mirrors at different institutes. Since 2007, there have been many changes in MySQL land: MySQL has been sold twice and there are some concerns that the development of MySQL may be stopped by its current owner. Fortunately there are several open source forks of MySQL, which guarantee the future of our database. In addition to this, current versions of MySQL (and MariaDB) include improvements which allow for a real multi-master setup. With this setup a NMDB 2.0 database with several distributed masters could be created, so that NMDB can continue to grow without overloading our database and providing even faster access for data providers and users.
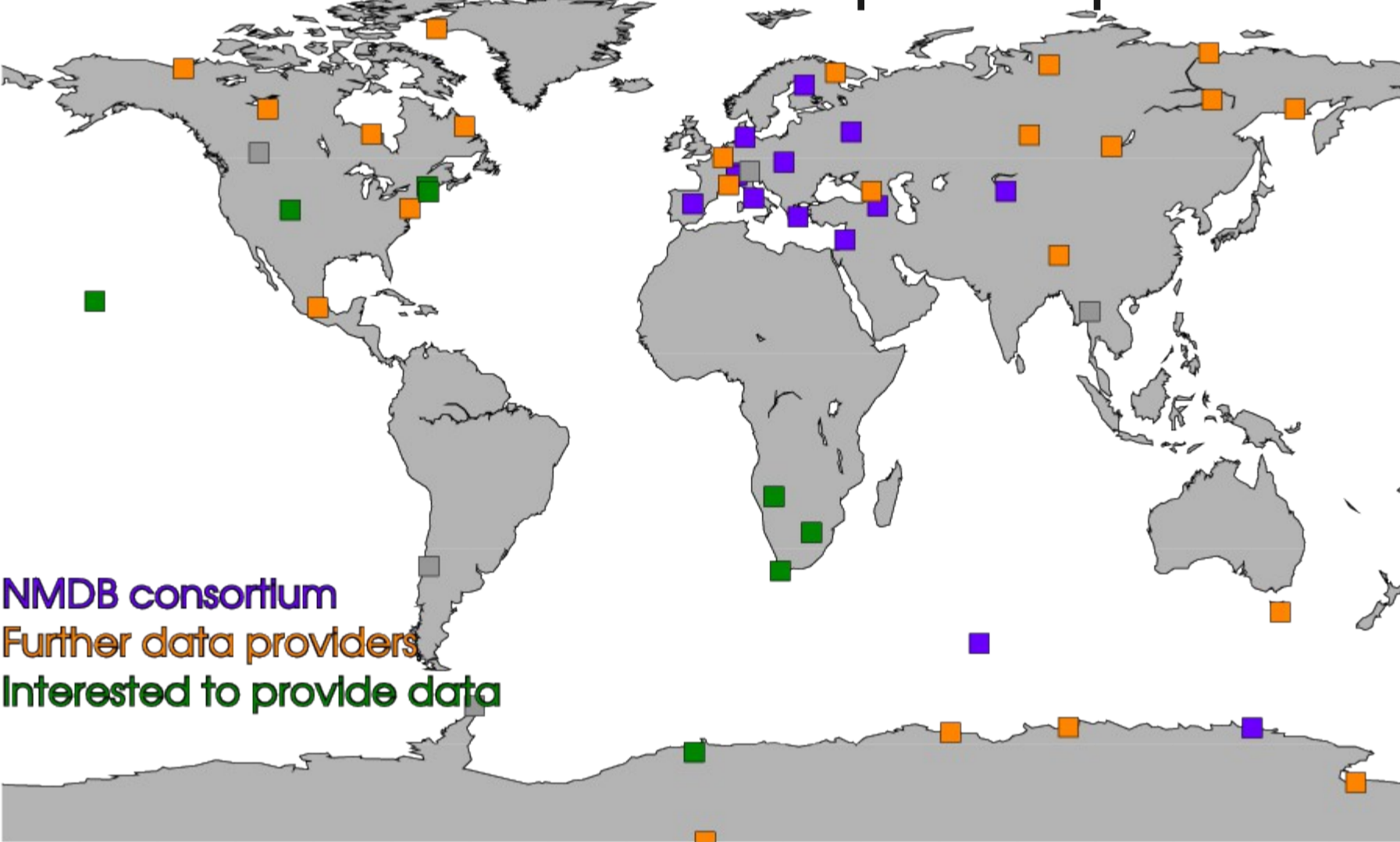
NMDB is an e-Infrastructures project which was supported by the Seventh Framework Programme (FP7) in the Capacities Programme of the European Commission in 2008 and 2009.
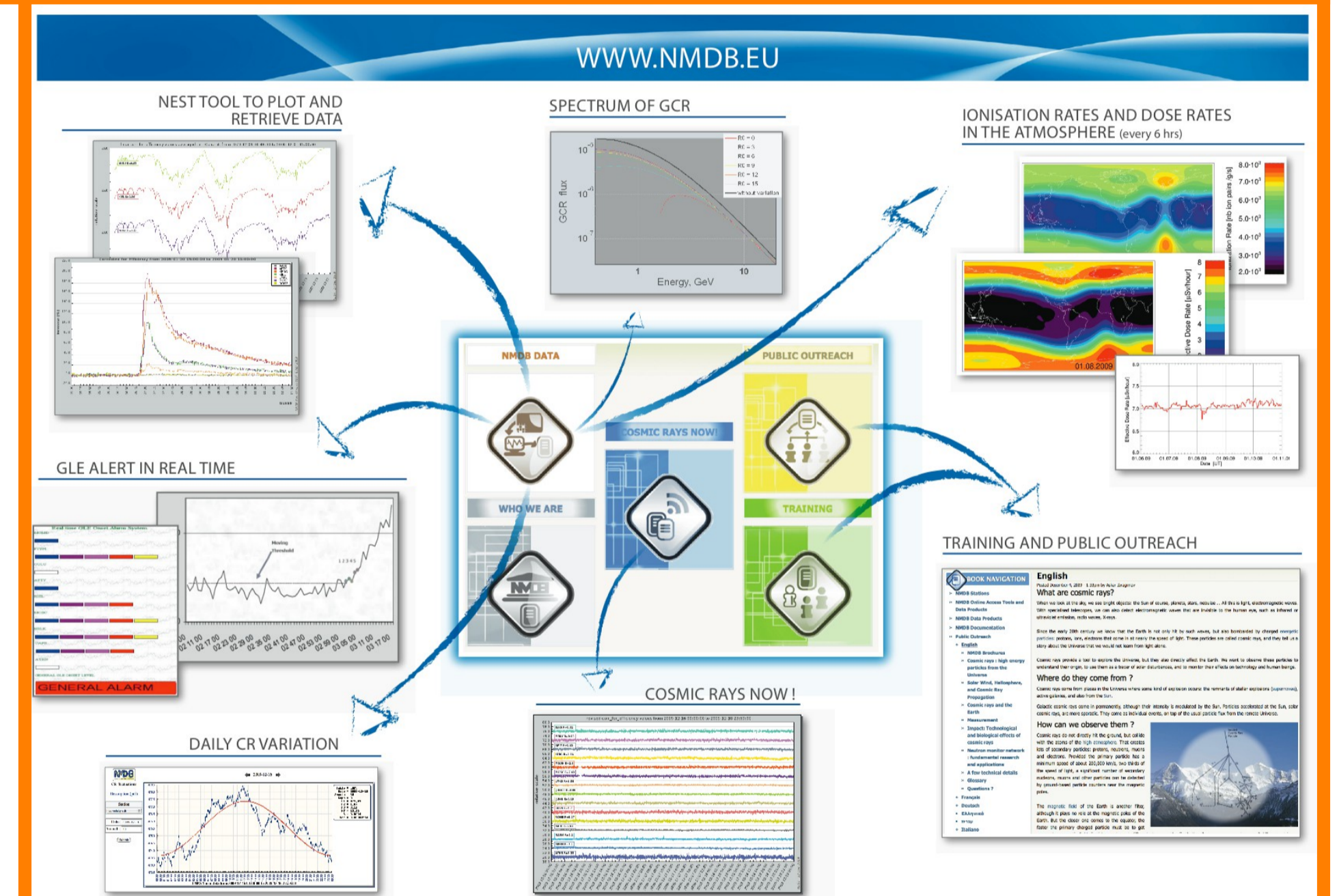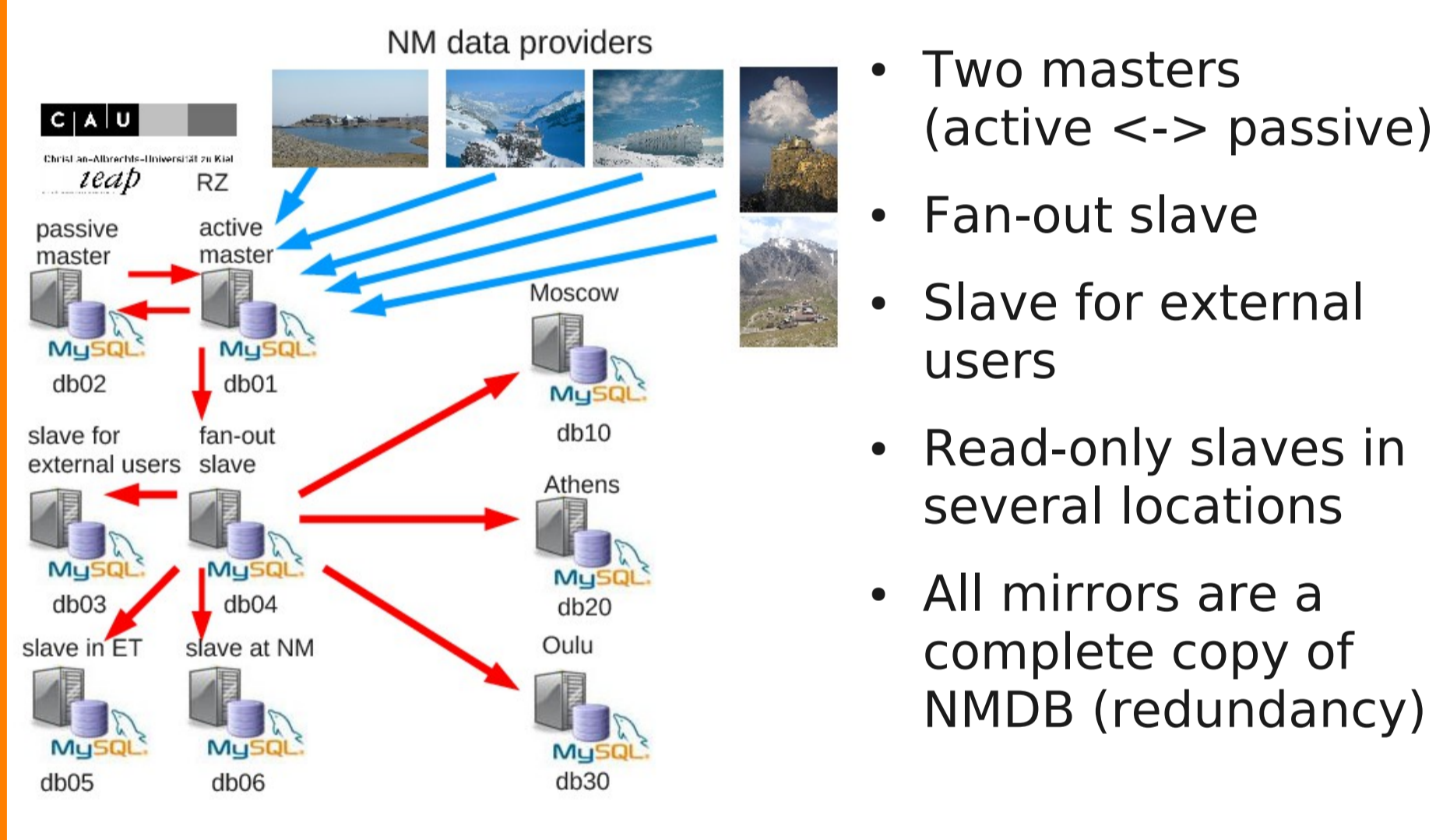
http://www.nmdb.eu
mail@nmdb.eu

Incident Cosmic Ray Particle

About 50 NM stations participate

NMDB consortium
Further data providers
Interested to provide data

NMDB data flow

NM data providers

passive master db02
active master db01
slave for external users db03
fan-out slave db04
slave in ET db05
slave at NM db06

Moscow db10
Athens db20
Oulu db30

- Two masters (active <-> passive)
- Fan-out slave
- Slave for external users
- Read-only slaves in several locations
- All mirrors are a complete copy of NMDB (redundancy)

WWW.NMDB.EU

Other uses made possible with NMDB

- Dosimetry for airplane personel at Air France, DLR, Globalog
- Space Weather Alerts at NOOA
- integrated Space Weather Analysis at CCMC (NASA/GSFC)
- Cosmic Rays and Climate
- Cosmic Ray - cloud connections
- Cosmic Rays and the geomagnetic field
- Cosmic Ray Soil Moisture Observing System (COSMOS)
- soil moisture monitoring network in Australia (CosmOz)
- Soil moisture measurements at UFZ Leipzig
- DHS/NUSTL?
- ...

https://blog.mariadb.org/mariadb-10-0-beta-launched-an-important-milestone/

MariaDB 10.0 Beta launched – an important milestone
Posted on 07 Nov 2013 by rasmus | 4 Replies

MariaDB 10.0 is a massive release with loads of new features which ease several pain points that MariaDB and MySQL users have run into over the years.
[...]
REPLICATION

Global Transaction Id – In replication, MariaDB 10.0 introduces a new building block, Global Transaction Id(GTID). The implementation is different from the corresponding functionality in MySQL 5.6 and the main goals of the implementation have been 1) make it easy to set up replication with GTID and easily provision new slaves and 2) support other replication features such as Multi-Source Replication (see below). The introduction of GTID also makes the slaves crash safe, which they haven't been before.

Members of the NMDB consortium

Christian-Albrechts Universität zu Kiel Germany

l'Observatoire de Paris France

National and Kapodistrian University of Athens Greece

Slovak Academy of Science Slovakia

Sodankylä Geophysical Observatory Finland

Aragats Space Environment Center Armenia

NMDB v2.0
MySQL 5.6 / MariaDB 10.0
- Multi-Master setup to reduce load on servers
- Parellel replication to reduce lag on mirrors
- Global Transaction IDs to simplify mirror setup and sync
- SSD drives to increase performance

- NMDB uses a common data format (SQL)
- NMDB2.0 should use common data processing (corrections) as well as common software for submitting data
- Integrate new (and historic) stations made easy with common software (AUS, MEX, Tibet, ...)
-

Multi-Source Replication – With Multi-source replication, contributed by Lixun Peng and Taobao you can replicate data from many masters to one slave. This is very useful when you have sharded your data and want a complete copy of it on one server. For this very reason Tumblr, the microblogging site, nowadays part of Yahoo! is already using this feature. Check out the story.

Parallel Slave (sponsored by Google) - Finally, MariaDB 10.0 solves a long lasting replication challenge that even exists in MySQL 5.6. Until now, with enough writes (INSERT/UPDATE) happening on a master the slaves would not be able to keep up at the same pace and they would lag behind. With the parallel slave feature in 10.0 this challenge is now gone. The slaves will adapt to the speed of the master and apply binlog events in parallel. Transactions will be applied in parallel if they were executed in parallel on the master. Unlike MySQL 5.6, the transactions can concern the same database or even the same table.

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Universita Roma Tre Dipartimento di Fisica Italy

University of Alcala Spain

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